

## **REMARKS**

Claims 1-9 are pending and stand rejected. Reconsideration and allowance are respectfully requested.

### **Claim Rejection under 35 U.S.C. § 102(b)**

On page 2 of the Office Action the Examiner rejected claims 1-2 and 5 under 35 U.S.C. § 102(b) as being anticipated by Lin et al. (U.S. Patent No. 5,591,139, “the ‘139 patent”). The Examiner alleges that the ‘139 patent clearly anticipates claim 1. The applicants respectfully traverse this rejection. The ‘139 patent does not teach or suggest each and every limitation of claim 1. The applicants incorporate by reference the previously made arguments to the 102(e) rejection of claims 1-2 and 5 as being anticipated by the ‘139 patent in the January 7, 2009, Response to the Office Action mailed October 21, 2008. Claim 1 recites a microheater for microfluidic devices comprising at least one microchannel having a length formed on a substrate and further comprising at least one conductor disposed in said microchannel along a majority of the length of said microchannel. Claim 1 requires the presence or formation of a microheater or microheater device in a microchannel along a majority of a length of the microchannel.

The ‘139 patent neither discloses nor suggests a microchannel having disposed therein a microheater or microheater device that is disposed along a majority of a length of a microchannel. The only microheater in the ‘139 patent is formed from a plurality of individual resistors 60 perpendicular to the microchannel and is located only in microflow channel 78 at the interface region 11 of the microneedle 10 (*see* col. 3, lines 36-38 and FIG. 2A of the ‘139 patent). There is no microheater or means to achieve microheating located in the remaining majority portion of the microflow channel 78. In contrast, the presently claimed invention includes a microheater that extends through at least a majority of the microchannel. As a result, the ‘139 patent does not contain each and every limitation of claim 1.

On page 5 the Examiner especially notes that the ‘139 patent recites:

Heating resistors 60 may be used to form a thermally-driven, cascaded-bubble micropump or simple heater. The microneedle may also include detector resistors 62 which extend along the bottom of the microchannel (see FIG. 1B) and are coupled to electrodes 84 (FIG. 3L-2) on the tip 86 of the needle. Microflow channel 78 is formed by removing sacrificial layers from underneath a shell 26 during processing. In order to access the sacrificial layer, etch access holes 74 are opened and then filled after etching. The fabrication procedures will be discussed below in relation to FIGS. 3A-1 through 3N-2.

This cited portion of the '139 patent does not teach or suggest at least one conductor disposed in the microchannel along a majority of the length of the microchannel as in claim 1. The heating resistors 60 and detector resistors 62 of the '139 patent are completely different and are not related to one another in any way. As further disclosed in the '139 patent, the "detector resistors 62 extend lengthwise along shaft 14 and function as wires to relay a signal from electrodes or recording sites 84 (FIG. 2A) to the shank end of the channel, where electronics 24 process the signals" (col. 5, lines 19-22 of the '139 patent). As disclosed, the detector resistors 62 that extend along the shaft 14, have absolutely nothing to do with heating. Clearly, the '139 patent does not disclose any resistor along shaft 14 that could be construed as heating resistors. As a result, the '139 patent does not contain each and every limitation of claim 1.

In light of the above discussion, the '139 patent does not contain each and every limitation of claim 1. Therefore, it cannot anticipate claim 1. Claims 2 and 5 which depend from claim 1 and recite additional features are also not anticipated and therefore allowable. Accordingly, the Applicants respectfully request the Examiner withdraw the rejection.

#### Claim Rejections under 35 U.S.C. § 103(a)

On page 3 the Examiner rejected claims 6-7 and 9 under 35 U.S.C. § 103(a) as being unpatentable over Lin et al. (U.S. Patent No. 5,591,139) in view of Ferguson (2003/0209534). Applicants respectfully traverse this rejection. Claim 1, from which claims 6, 7 and 9 depend, has

been recited hereinabove. Applicants submit that neither the '139 patent nor Ferguson, alone or in combination, teach or suggest the present invention as claimed. Moreover, Applicants submit there would have been no motivation to combine the references, and even if such combination were made, the claimed invention would not result therefrom.

The '139 patent relates to a micromachined needle having an interface region 11 and elongated shaft portion 14 and enclosed microchannel 78 disposed along the length of the interface region 11 and shaft portion 14. The enclosed microchannel 78 includes a microheater 60 only in the interface region 11 and specifically does not include any heating device in the shaft region. See, *e.g.*, FIG 1A. Since the '139 patent does not disclose, teach or suggest a microheater comprising at least one microchannel having a length formed on a substrate and further comprising at least one conductor disposed in said microchannel along a majority of the length of said microchannel as in claim 1, the teachings of the '139 patent would not motivate one skilled in the art to look to Ferguson to achieve the presently claimed invention. Thus the combination of Lin '139 and Ferguson is improper. In any event, the combination does not result in the claimed invention. The shortcomings of the '139 patent have been set forth in detail. Nothing in Ferguson even remotely suggests at least one conductor disposed in a microchannel along a majority of the length of a microchannel as in claim 1. Accordingly, Ferguson does not remedy the deficiency in the '139 patent.

The combination of the teachings of the '139 patent and Ferguson result in a microheater disposed only in an interface region of a microneedle having a substrate comprising quartz and borosilicate glass. That combination is not the invention of claim 1, let alone dependent claims 6, 7 and/or 9.

Based on the foregoing, the Applicants submit claims 6, 7 and 9, which depend from claim 1 and recite additional features, are not obvious in view of the cited references. Accordingly, the Applicants respectfully request the Examiner withdraw the rejection.

On page 3 the Examiner rejected claim 3 under 35 U.S.C. § 103(a) as being unpatentable

over Lin in view of Kenny (6,551,849). The Applicants respectfully traverse this rejection. Claim 3 depends from claim 1 and recites further features, *i.e.*, the conductor comprises an aluminum alloy comprising 99% aluminum and silicon and copper. The shortcomings of the '139 patent with respect to claim 1 have been detailed hereinabove. Kenny cannot cure these shortcomings. Moreover, Kenny does not disclose the alloy of claim 3. Since the '139 patent does not teach or suggest the invention of claim 1, and Kenny does not disclose the limitations of claim 3, the combination of references cannot result in the invention of claim 3. Accordingly, the Applicants respectfully request the Examiner withdraw the rejection.

On page 4 the Examiner rejected claims 4 and 8 under 35 U.S.C. § 103(a) as being unpatentable over Lin in view of Yamazaki et al. (6,165,876) and further in view of Ueno et al. (2002/00224662). The Applicants respectfully traverse this rejection. Claims 4 and 8 depend from claim 1 and recite additional features. As set forth in detail hereinabove, the '139 patent does not disclose the invention of claim 1. The teachings of Yamazaki cannot cure the deficiencies of the '139 patent to achieve the invention of claims 4 and 8. The combination of the '139 patent and Yamazaki at best result in a microneedle device having an enclosed microchannel with a boron ion-implanted microheater only in the interface region and specifically does not include any heating device in the shaft region. This is not the invention of claims 4 and/or 8. Nor can the additional reference to Ueno cure the deficiencies of the '139 patent alone or in combination with Yamazaki. Accordingly, the Applicants respectfully request the Examiner withdraw the rejection.

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Attorney Docket No.: 436-12 (02-05)

Applicants submit that all claims pending in the patent application are in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issuance are earnestly solicited. In the event there are any fees due and owing in connection with this matter, please charge same to our Deposit Account No. 11-0223.

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Respectfully submitted,

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